
Existing & Future Operating Conditions

Eastern Region
SR 291 Route Development Plan
Freya Street to Scotts Valley Road

Traffic Volumes

Traffic volumes along SR 291 vary according to the time of day, recreational seasons, and if school is in session or not. Existing annual average daily traffic (AADT), PM peak hour traffic (*evening commute*), and turning movement volume data was collected along the mainline and at major county intersections on SR 291 for analysis. The following tables summarize the findings:

SR 291 Average Daily Traffic

Mile Post	Year				K%
	2001	2004	2015**	2025**	
Seven Mile Rd (MP 5.22)	12000	12000	15700	20200	0.09
Rutter-Parkway (MP 9.11)	7900	8600	11300	14400	0.11
Charles Rd (MP 9.20)	9000	10000	13100	16800	0.09
Swenson Rd (MP 12.98)	7100	7700	10100	12900	0.11
Sunrise/Blackstone Dr. (MP 13.36)	*	7800	10200	13100	0.10
Suncrest Drive (MP 13.82)	6900	7000	9200	11800	0.10
Wylie Drive (MP 14.35)	*	5600	7300	9400	0.09
Moriah Drive (MP 15.13)	*	4000	5200	6700	0.10
Jergens Rd (MP 15.96)	*	3600	4700	6000	0.09
Whitmore Hill Rd (MP 16.05)	3100	3100	4100	5200	0.09
Stonelodge Rd (MP 18.41)	*	1800	2400	3000	0.08
McAllister Rd (MP 21.36)	990	1200	1600	2000	0.07
Scotts Valley Rd (MP 22.31)	*	980	1300	1600	0.07

* Traffic counts not available

Source: 1999-2002 Annual Traffic Report and WSDOT TRIPS System ** Based on 2.5% growth rate from year 2002 & 2003 actual counts

K% - ratio of design hour traffic to AADT

Level of Service

A level of service (LOS) analysis evaluates the traffic volumes and operational characteristics of a designated segment of a highway. The product of the analysis is a description of the highway's traffic carrying capacity as defined by six levels of service. Level of Service is a qualitative measure describing operational conditions within a traffic stream, generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The LOS was calculated using existing PM peak hour volumes. The table below shows the service range from LOS A, representing the best operating conditions, to LOS F, representing the worst.

Level of Service	Operating Conditions
A	<ul style="list-style-type: none">• Free-flow operations at average travel speeds• Vehicles completely unimpeded within the traffic stream• Platoons of three or more vehicles are rare
B	<ul style="list-style-type: none">• Reasonably unimpeded operations at average travel speeds• Maneuverability within traffic stream is slightly restricted• Drivers delayed in platoons up to 50% of the time
C <i>(minimum LOS for Rural highways in Washington)</i>	<ul style="list-style-type: none">• Stable operations• Ability to maneuver becomes more restrictive• Drivers delayed in platoons up to 65% of the time
D <i>(minimum LOS for Urban highways in Washington)</i>	<ul style="list-style-type: none">• Unstable traffic flow• Small increases in flow may cause substantial increases in delays and speed• Passing demand high but passing capacity approaches zero• Drivers are delayed in platoons for nearly 80% of the time
E	<ul style="list-style-type: none">• Significant delays and average travel speeds less than base condition• Adverse progression, passing is virtually impossible
F	<ul style="list-style-type: none">• Heavily congested flow with traffic demand exceeding capacity• High delays and queuing expected

Source: Highway Capacity Manual 2000

Level of service analysis for the unsignalized intersections was accomplished using HCS2000 for two-way stop-controlled intersections. Many of the intersections within the RDP limits are unsignalized. WSDOT Eastern Region Planning and Traffic offices have drafted a Signal and Channelization Priority Array that identifies and ranks intersections recommended for signalization.

Level of Service Criteria for Two Way Stop Control Intersections

Level of Service	*Average Control Delay (sec/veh)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F	>50

Source: Highway Capacity Manual 2000

*Control delay is the total time from when a vehicle stops to when the vehicle departs the intersection

To provide detailed intersection operational analysis at significant intersections within the RDP limits, turn movement counts were collected. While the LOS at unsignalized intersections is measured in terms of average vehicle delay, the overall intersection LOS is based on the LOS of the worst approach movement. The LOS was calculated using existing PM peak hour volumes. The following table shows the results of the analysis.

Two Way Stop Control Intersections (2004 vs. 2025)

Intersection	2004				2025			
	Minor Rd. Lt	Minor Rd. Rt	SR 291 EB	SR 291 WB	Minor Rd. Lt	Minor Rd. Rt	SR 291 EB	SR 291 WB
"A" Street	159	77	894	1712	202	98	1136	2175
Assembly/Driscoll/ Francis	275	61	620	636	350	77	789	808
Rifle Club Road	92	70	497	928	116	89	632	1180
Seven Mile/Lowell Road	177	6	332	722	225	9	422	917
Kendick Drive	25	--	233	666	31	--	296	846
Rutter-Parkway	--	79	239	797	--	99	304	1013
Charles Road	206	--	231	583	259	--	293	741
Swenson Road	84	75	238	551	107	95	302	701
Sunrise/Blackstone	82	8	178	535	103	10	255	719
Suncrest Drive	187	--	139	344	237	--	262	462
Wylie Drive	85	2	199	285	108	2	252	361
Moriah Drive	64	--	172	264	81	--	217	334
Jergens Road	--	14	100	204	--	17	126	259
Whitmore Hill Road	--	16	100	185	--	20	126	235
Stonelodge Road	24	--	54	73	31	--	68	93
McAllister Road	--	8	43	40	--	10	54	48
Scotts Valley Road	--	2	24	44	--	3	31	56

*2004 values are Peak hour traffic counts. 2025 Peak hour counts based on projected growth factors.

With the projected traffic volumes in year 2025 for the facility, assuming a 'No Build' condition where no improvements have been made, intersections will operate at the LOS designated in the table below. A traffic signal may be proposed at any of these intersections if at the time of design it meets signal warrants, and a signal is determined to be the appropriate fix.

Two Way Stop Control Intersections Level Of Service (LOS)

Intersection	2004 LOS	2025 (No Build) LOS
"A" Street	E	F
Assembly/Driscoll/ Francis	F	F
Rifle Club Road	F	F
Seven Mile/Lowell Road	F	F
Kendick Drive	B	B
Rutter-Parkway	C	C
Charles Road	C	F
Swenson Road	C	F
Sunrise/Blackstone	C	D
Suncrest Drive	B	B
Wylie Drive	C	C
Moriah Drive	A	B
Jergens Road	B	B
Whitmore Hill Road	A	B
Stonelodge Road	A	A
McAllister Road	A	A
Scotts Valley Road	A	A

**LOS Evaluated by Highway Capacity Software 2000.*

Collisions

WSDOT uses two major programs, the High Accident Location (HAL) and the High Accident Corridor (HAC) programs, to address areas with frequent collisions along state highways.

Threshold criteria for identifying HAL and HAC locations include total points per mile (based on point values assigned to severity of accidents), number of accidents per mile, and average severity per mile. Severity point assignments are shown below.

- 10 - POINTS PER FATAL ACCIDENT**
- 9 - POINTS PER DISABLING INJURY ACCIDENT**
- 3 - POINTS PER EVIDENT INJURY ACCIDENT**
- 2 - POINTS PER INJURY ACCIDENT**
- 1 - POINT PER PROPERTY DAMAGE ONLY ACCIDENT**

Currently, there is one HAC identified on this segment of SR 291. However, there is currently a project to improve the safety of the High Accident Corridor (HAC) on SR 291 in the vicinity of the nine mile community between MP 8.5 and 9.5 to the northwest of Spokane.

The current Rutter Parkway intersection joins SR 291 at a sharp angle and steep grade. The project will relocate SR 291 to the south and west and, as a result, move the SR 291/Rutter Parkway intersection to the small business district in the Nine Mile community. The new intersection will be a "T" configuration and the SR 291 roadway will have an added center turn lane. (See Appendix A for Design Layout)

Severity points were calculated for the years 2001 to 2003 and showed a significant decrease in the points (see table below).

Year	Severity Points
2001	317
2002	288
2003	284

The State's Transportation Data Office is supplied with the reported traffic accidents from the Washington State Patrol (WSP) that are \$500 or more. This data is compiled and a report is created called "Washington State Annual Highway Collision Data Summary". Accident and fatality rates on a segment of highway are typically compared to statewide rates as well as rates for the region, state functional classification, and county based on single or multi-year periods. The table below shows these comparisons. The most recent year covered by this report (for comparing statewide data) is the 2004 Collision Data Summary.

	2001* SR 291	2002* SR 291	2003* SR 291	WA State 2004	Eastern Region 2004	Rural Minor Arterial 2004	All Minor Arterials 2004	Spokane County 2004
Accident Rate	1.65	1.52	1.62	1.51	1.35	1.29	1.87	1.65
Fatal Acc. Rate	0	1.81	0	0.79	0.95	2.64	2.08	0.71

*Rates are based on 13000 ADT – actual 2000 count;

Source: Accident Data Run Date: 6/16/2000 (Includes partial accident records)

**Accident Rate = $\frac{(\text{Number of Accidents}) \times (1\text{million})}{(\text{Section Length}) \times (\text{AADT}) \times (365 \text{ Days})}$

Fatal Accident Rate = $\frac{(\text{Number of Accidents}) \times (100\text{million})}{(\text{Section Length}) \times (\text{AADT}) \times (365 \text{ Days})}$

In 2004, the accident rate for Spokane County was 1.65 accidents per million vehicle miles of travel compared to the statewide and Eastern Region average accident rates of 1.51 and 1.35, respectively. During this same period the average accident rate along minor arterials in rural areas statewide was 1.29. Accident data from November 30, 1998 to November 30, 2001 for SR 291 between MP 12.51 and MP 16.74 reveals the following:

COLLISION TYPE

Type	Number of Collisions	% Total
Entering at Angle	168	30.4%
Rearend	230	41.6%
Off-Road (incl. overturn, etc.)	23	4.2%
Sideswipe opposite dir.	33	6.0%
Head-on	7	1.3%
Pedestrian/Bike	12	2.0%
Other Object	80	14.5%
TOTAL	553	100%

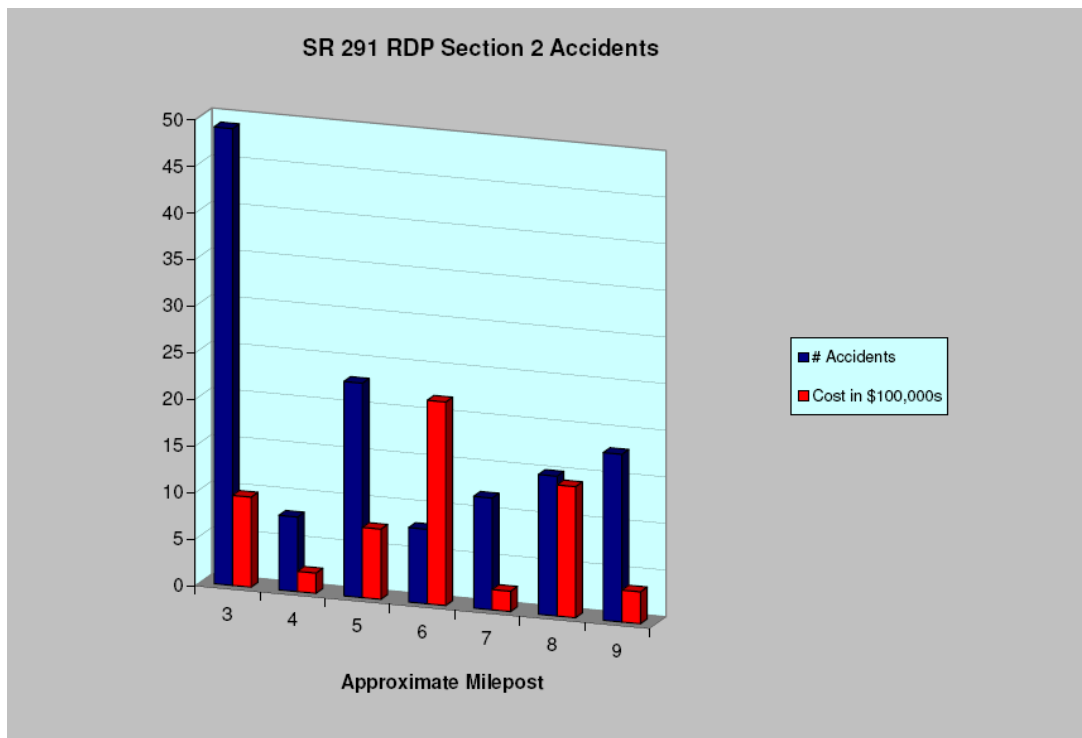
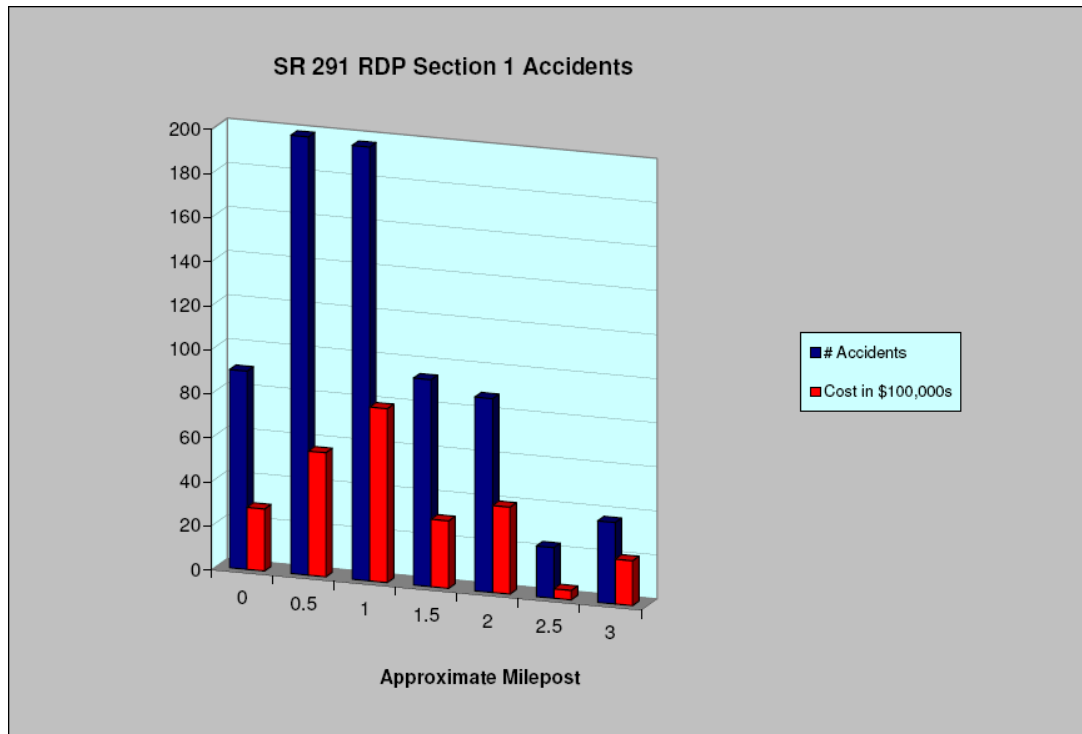
Source: Trips data (Above data contains both full and partial accident records.)

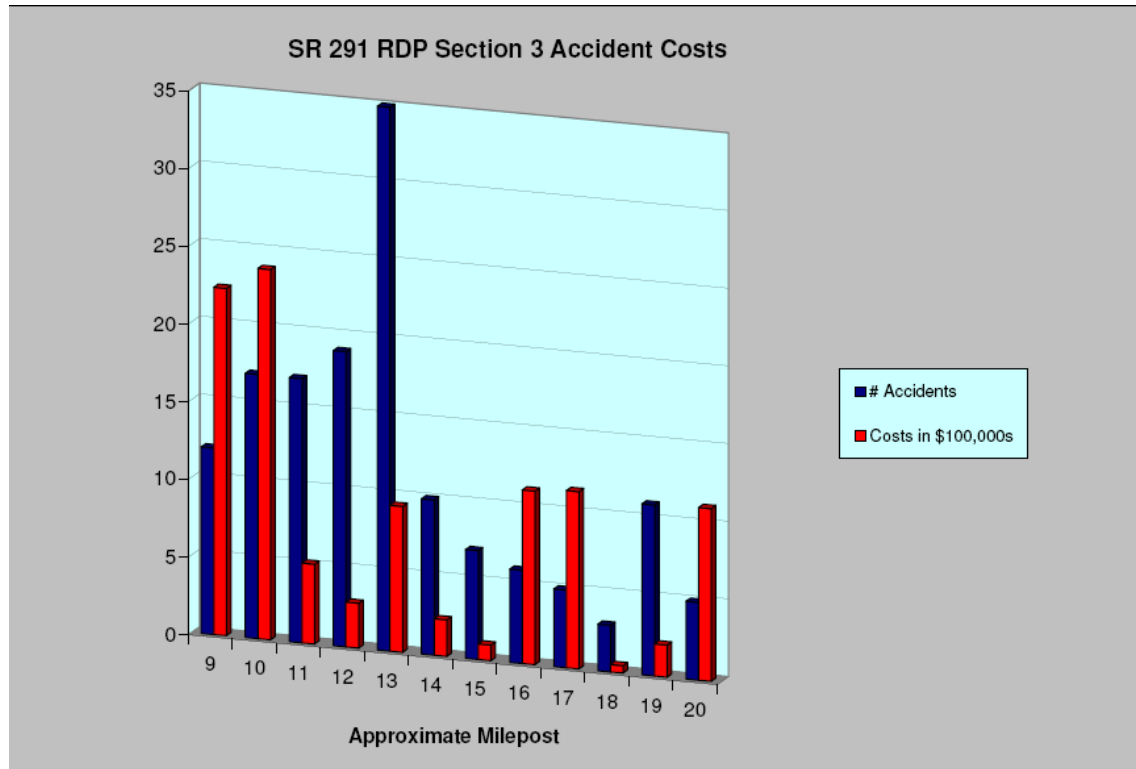
COLLISION SEVERITY

Injury Type	Number of Collisions	% Total
Property Damage Only:	296	53.5%
Injury Accidents:		
Possible Injury	163	29.5%
Evident Injury	68	12.3%
Disabling Injury	9	1.6%
Fatal	2	0.4%
Injury Status Unknown	15	2.7%
Total Accidents	553	100%

Source: Trips Data (Above data contains both full and partial accident records.)

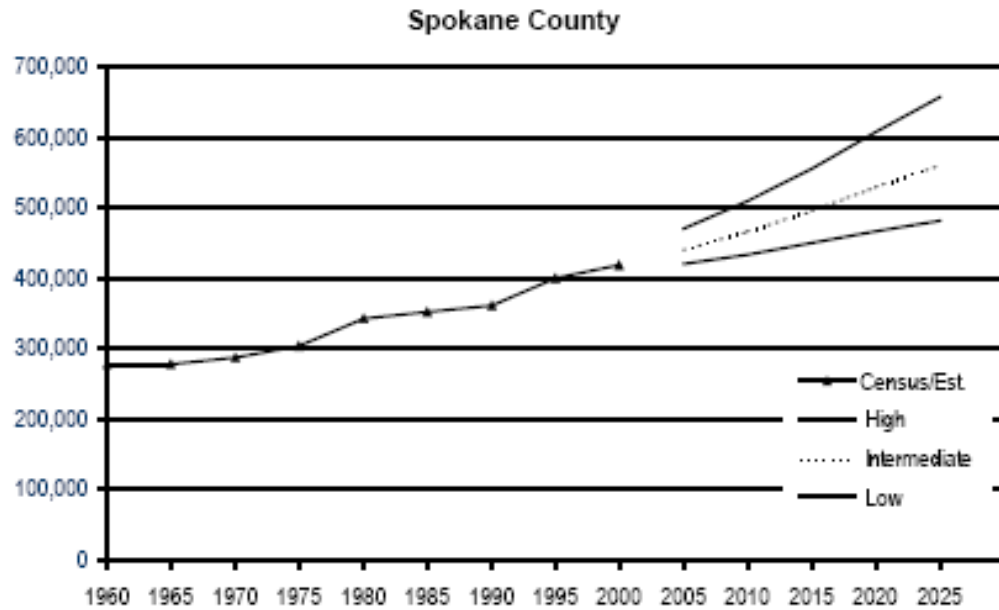
COLLISION COSTS RELATIVE TO ACCIDENTS TOTALS



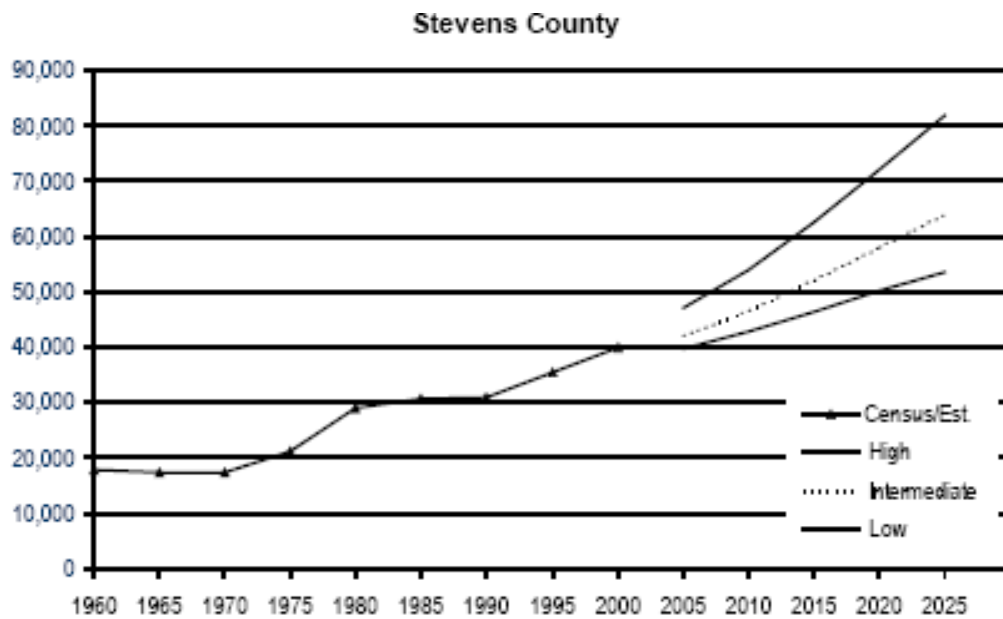


Growth Rates

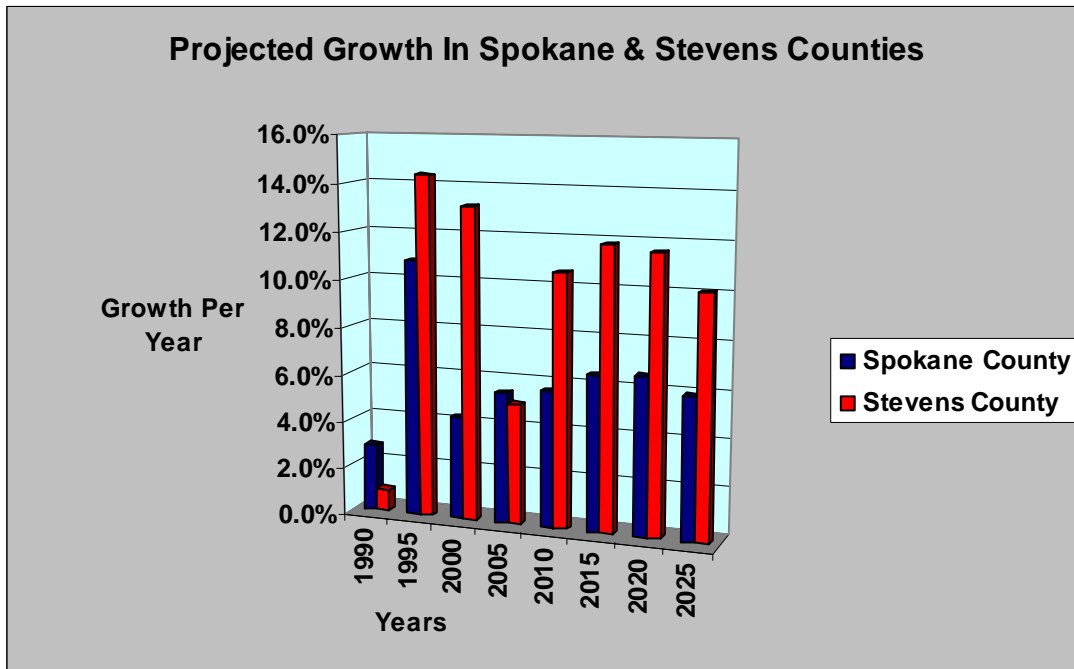
In 1995 the populations in Spokane and Stevens Counties were 400,500 and 35,400 people respectively. These figures in 2005 grew to 441,100 and 42,100, representing 10% growth in Spokane County and a 19% growth in Stevens County over 10 years. The Washington State Office of Financial Management (OFM) is forecasting similar growth trends for these areas through the year 2025. *(See Graphics Next Page)*



Source: OFM Forecast January 2002.



Source: OFM Forecast January 2002



Traffic Growth Rate

Increased traffic generated by a steady expansion in residential and commercial uses throughout the SR 291 Corridor will place increasing demands on the facility. Traffic volumes were projected to 2025 for long term analysis. The 2.5% growth rate was derived from historic counts acquired from WSDOT Traffic Data Office. The table below illustrates projected traffic numbers throughout each section of the SR 291 Corridor study.

Section	Existing	2011	2025
1 – Freya St. to Nine Mile Wye	29,000	32,800	46,400
2 – Nine Mile Wye to Charles Rd.	9,200	10,400	14,700
3 – Charles Rd to Scotts Valley Rd.	7,100	8,000	11,400
